

Application No. 09/767,542

AMENDMENTS TO THE CLAIMS

A detailed listing of all claims that are, or were, in the present application, irrespective of whether the claim(s) remains under examination in the application are presented below. The claims are presented in ascending order and each includes one status identifier. Those claims not cancelled or withdrawn but amended by the current amendment utilize the following notations for amendment: 1. deleted matter is shown by strikethrough for six or more characters and double brackets for five or less characters; and 2. added matter is shown by underlining.

1. (Currently Amended) A plasma injector assembly for use in a munition having a central axis, the plasma injector assembly comprising:

a stub case for attachment to the munition along the central axis;

an anode positioned in the stub case; [[and]]

a cathode positioned in the stub case, wherein the anode and the cathode are located at opposite ends of a plasma creation region, wherein the plasma creation region is aligned along a planar depth that is substantially transverse to the central axis[[.]],

and

a vent assembly disposed between the plasma creation region and a propellant region.

2. (Original) The plasma injector assembly of claim 1, and further comprising a conductive wire that interconnects the anode and the cathode.

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3. (Currently Amended) The plasma injector assembly of claim 1, wherein the plasma injector assembly has a tube with a first end and a second end, wherein the anode is placed in the first end, wherein the cathode is placed in the second end, and wherein the tube has at least one aperture formed therein such that a region inside the tube is in communication with a propellant in the munition the vent assembly.

4. (Currently Amended) The plasma injector assembly of claim 3, wherein the plasma injector assembly substantially ignites the propellant within about 1-2 milliseconds.

5. (Currently Amended) The plasma injector assembly of claim 1, wherein the plasma injector assembly produces plasma that is ~~substantially directed along the central axis~~ directed into the propellant region by a plurality of apertures in the vent assembly.

6. (Currently Amended) A plasma injector assembly for use in a munition having a central axis, the plasma injector comprising:

a stub case for attachment to the munition along the central axis;

a tube having a first end and a second end, wherein the tube has a central bore extending therethrough, wherein the tube has at least one aperture that is operably connected to the central bore, and wherein the tube is mounted to the stub case in an orientation that is substantially transverse to the central axis;

an anode positioned proximate the first end;

a cathode positioned proximate the second end; [[and]]

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a conductive wire extending through the central bore between the anode and the cathode  
and operably connecting the anode and the cathode[.] ; and  
a vent assembly having an aft end and a forward end wherein the aft end is in  
communication with the tube and a forward end is in communication with a  
propellant.

7. (Currently Amended) The plasma injector assembly of claim 6, wherein the plasma injector  
assembly substantially ignites the propellant within about 1-2 milliseconds.

8. (Currently Amended) The plasma injector assembly of claim 6, wherein the plasma injector  
vent assembly directs plasma into the munition in a plurality of directions that is substantially  
aligned with the central axis so as to avoid a projectile guide mechanism.

9. (Cancel)

10. (Cancel)

11. (Cancel)

12. (Currently Amended) A munition comprising:

a stub case;

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a casing attached to the stub case, wherein the stub case and the casing are oriented along a central axis;

a projectile attached to the casing opposite the stub case, wherein the stub case, casing and the projectile define a substantially enclosed region;

a propellant substantially filling the substantially enclosed region; [[and]]

a plasma injector mounted substantially within the stub case in communication with the propellant, wherein the plasma injector has an anode and a cathode that are aligned along a planar depth that is substantially transverse to the central axis[.]

; and

a filler material having a channel formed therein, wherein the channel is adapted to receive the anode and the cathode, and wherein the filler material has at least one aperture that extends through the filler material to the substantially enclosed region.

13. (Original) The munition of claim 12, wherein the plasma injector extends into the munition less than 12 percent of a length of the munition.

14. (Original) The munition of claim 12, and further comprising a conductive wire that interconnects the anode and the cathode.

15. (Original) The munition of claim 12, wherein the plasma injector has a tube with a first end and a second end, wherein the anode is placed in the first end, wherein the cathode is placed in

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the second end, and wherein the tube has at least one aperture formed therein such that a region inside the tube is in communication with the propellant.

16. (Cancel)

17. (Currently Amended) A munition comprising:

a stub case;

a casing attached to the stub case, wherein the stub case and the casing are oriented along a central axis;

a projectile attached to the casing opposite the stub case, wherein the stub case, casing and the projectile define a substantially enclosed region, wherein the projectile has a guide portion that extends into the substantially enclosed region for a length that is at least one-half a length of the substantially enclosed region along the central axis, wherein the guide portion enhances the ability to accurately propel the projectile;

a propellant substantially filling the substantially enclosed region; and

a plasma injector mounted substantially within the stub case in communication with the propellant, a vent assembly, said vent assembly to channel a plasma into the propellant, wherein the plasma injector has an anode and a cathode.

18. (Original) The munition of claim 17, wherein the plasma injector extends into the munition less than 12 percent of a length of the munition.

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19. (Original) The munition of claim 17, wherein the guide portion extends more than 80 percent into a length of the substantially enclosed region.

20. (Currently Amended) The munition of claim 17, wherein the anode and the cathode are aligned along a single planar depth that is substantially transverse to the central axis.

21. (Original) The munition of claim 17, wherein the plasma injector has a tube with a first end and a second end, wherein the anode is placed in the first end, wherein the cathode is placed in the second end, and wherein the tube has at least one aperture formed therein such that a region inside the tube is in communication with the propellant.

22. (Currently Amended) A munition comprising:

a stub case;

a casing attached to the stub case, wherein the stub case and the casing are oriented along a central axis;

a projectile attached to the casing opposite the stub case, wherein the stub case, casing and the projectile define a substantially enclosed region;

a propellant substantially filling the substantially enclosed region; and

a plurality of plasma injectors mounted substantially within the stub case in communication with the propellant through a vent assembly, wherein each of the plasma injectors in the plurality of plasma injectors has an anode and a cathode

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that are aligned along a planar depth that is substantially transverse to the central axis.

23. (Original) The munition of claim 22, wherein the plasma injectors in the plurality of plasma injectors are connected in series.

24. (Original) The munition of claim 22, wherein the plasma injectors in the plurality of plasma injectors are connected in parallel.

25. (Currently Amended) The munition of claim 22, ~~and further comprising wherein each of the plasma injectors in the plurality of plasma injectors has~~ a conductive wire that interconnects the anode and the cathode.

26. (Original) The munition of claim 22, wherein each of the plasma injectors in the plurality of plasma injectors has a tube with a first end and a second end, wherein the anode is placed in the first end, wherein the cathode is placed in the second end, and wherein the tube has at least one aperture formed therein such that a region inside the tube is in communication with the propellant.

27. (Currently Amended) The munition of claim 22, ~~and further comprising wherein each of the plasma ignitors in the plurality of plasma injectors has~~ a filler material having a channel formed therein, wherein the channel is adapted to receive the anode and the cathode, and wherein the

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filler material has at least one aperture that extends through the filler material to the substantially enclosed region.

28. (Currently Amended) The munition of claim 27, ~~and further comprising place wherein each of the plasma ignitors in the plurality of plasma injectors has an intermediate electrode between the anode and the cathode.~~

29. (Currently Amended) A method of launching a munition, the method comprising:  
providing a munition having a propellant and a projectile, wherein the munition has a central axis;  
providing a plasma injector igniter having an anode and a cathode that are oriented along a planar depth that is substantially transverse to the central axis;  
passing current from the anode to the cathode to generate plasma; [[and]]  
directing the plasma into the propellant surrounding a projectile guide; and  
igniting the propellant with the plasma.

30. (Original) The method of claim 29, wherein the plasma injector extends into the munition less than 12 percent of a length of the munition.

31. (Original) The method of claim 29, and further comprising providing a tube and mounting the anode and the cathode at opposite ends of the tube.

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32. (Original) The method of claim 31, and further comprising forming at least one aperture in the tube.

33. (Original) The method of claim 29, wherein the munition further comprises a stub case and a casing, wherein the casing is attached to the projectile, wherein the stub case is operably attached to the casing opposite the projectile, and wherein the stub case, the casing and the projectile define a substantially enclosed region that is substantially filled with the propellant.

34. (Original) The method of claim 29, and further comprising operably connecting the anode and the cathode with a conductive wire.

35. (Original) The method of claim 29, wherein ignition of the propellant causes the projectile to be propelled away from the plasma injector.

36. (Currently Amended) The method of claim 29, wherein a vent assembly directs plasma so that the plasma injector ignites the propellant in a substantially uniform manner.

37. (Original) The method of claim 29, wherein the plasma injector substantially ignites the propellant within about 1-2 milliseconds.

38. (Currently Amended) A method of launching a munition, the method comprising:

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providing a munition having a casing and a stub case which define a substantially enclosed region that has an opening opposite the stub case; inserting a projectile into the substantially enclosed region through the opening so that a guide portion of the projectile extends more than 50 percent of a distance from the opening to the stub case, wherein the guide portion enhances the ability to accurately propel the projectile; mounting a plasma injector igniter at least partially in the stub case, wherein the plasma injector igniter has an anode and a cathode; passing current from the anode to the cathode to generate plasma; [[and]] directing the plasma so as not to contact the guide portion of the projectile; and igniting the propellant with the plasma.

39. (Original) The method of claim 38, wherein the plasma injector extends into the munition less than 12 percent of a length of the munition.

40. (Original) The method of claim 38, and further comprising operably connecting the anode and the cathode with a conductive wire.

41. (Original) The method of claim 38, wherein ignition of the propellant causes the projectile to be propelled away from the plasma injector.

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42. (Original) The method of claim 38, wherein the plasma injector ignites the propellant in a substantially uniform manner.
43. (Original) The method of claim 38, wherein the plasma injector substantially ignites the propellant within about 1-2 milliseconds.